Remarks

Claims 1-43 were pending. Claims 1 and 42 have been amended, and claim 7 has been canceled. Reconsideration and reexamination are respectfully requested in view of the amendments and the following remarks.

The rejection of claims 1-43 under 35 U.S.C. §103(a) as obvious over Riebel in combination with Young is respectfully traversed. Riebel discloses a fiber-reinforced protein-based biocomposite particulate material containing a legume-based thermosetting resin and cellulosic material, and rigid biocomposite pressure-formed materials produced therefrom. Abstract.

According to the Office Action, Riebel "teaches a process of making a cellulose fiber composite as claimed, except that Riebel et al does not explicitly teach the step of felting, which is taught by Young et al. . . ." However, Riebel does not teach or suggest that "the average moisture content of the cellulosic material is between about 8% and about 35% by weight after application of the resin binder" as now claimed.

Riebel uses particulate material with at least 55% moisture,

> Upon formation, the particulate material preferably contains about 55-75% moisture, i.e., water, and more preferably about 59-67% moisture, based on the total wet weight of the particles. As used herein, this material is referred to as the "high moisture-content" particulate material or particles. These particles are typically in the form of soft, pliable, tacky, irregularly shaped lumps or balls, although individual fiber-like particles can also be formed. They typically have a particle size (as determined by the largest dimension of the particle) of no greater than about 0.5 inch (1.3 cm), and often no greater than about 0.38 inch (0.97 cm). Typically, particles larger than this do not generally process well, e.g., dry or press well. These discrete particles are formed substantially simultaneously from an agglomerated mass of cellulosic material and legume-based resin under appropriate processing conditions, as described below. They have a relatively dry-feeling or semi-dry feeling even though they contain a large amount of water, e.g., about 55-75% total water content, which is believed to be bound within the particles such that it cannot be readily squeezed out under hand pressure as water is from a sponge. These high moisture-content particles have sufficient internal bond strength to exist as discrete

particles. Thus, they can be handled relatively easily in bulk manufacturing processes without significantly sticking together and agglomerating into larger particles.

Distinct advantages have been obtained upon forming such high moisture-content particles. For example, the unique "granite-like" appearance of the pressure-formed products of the present invention results from the fact that the composition and process described herein forms composite particles of this type. Although particles containing about 55-75% water are capable of forming pressure-formed products, particular advantage is realized if the moisture content is within a range of about 59-67%. That is, when the moisture content of the originally formed particles is about 59-67%, particularly desirable pressure-formed products with respect to their mechanical properties (e.g., high modulus of rupture, high modulus of elasticity, high hardness) and physical properties (e.g., low water absorption), are obtained, as illustrated by Example 2. Although the inventors do not intend to be held to any particular theory, it is believed that this optimum moisture content provides substantially complete impregnation of the cellulosic material, e.g., paper flakes, by the protein-based resin such that all the fibers are integrally associated or "fused" with the resin. If less than about 59% water is present in the high moisture-content particles, the cellulosic material is not fully impregnated and cellulose fibers protrude from the pliable balls forming "fuzzy" extensions. There may even be pieces of uncoated paper. If greater than about 75% water is used in the preparation of the particles, a slurry generally results from which particles are not formed. Furthermore, at such a high water content, the soy resin is diluted to the extent that the interparticle bond strength is reduced considerably. Thus, these high moisture-content particles are not simply surface-coated pieces of paper, nor are they particles of pulped paper.

Col. 5, line 57 to col. 6, line 47

Upon blending the colored batches at stage 4, a mixture of relatively dry-feeling or semi-dry feeling ball-shaped particles is obtained, although the particles contain a large amount of water, e.g., about 55-75% total water content. Although the consistency of the mixture could be referred to as being similar to coleslaw in that coleslaw contains "wet" particles, the consistency is more like a flocculant, and is significantly different

> from the aqueous slurries or adhesive-coated paper flakes that are prepared in most conventional recycled newsprint processes.

Col. 17, line 61 to col. 18, line 3.

Riebel teaches away from using particulate material having a moisture content of less than 55%. In Example 2, Riebel described the effect of using particles having moisture contents between 55% and 75%. The panels made with a moisture content of 55% had the poorest strength and stiffness, and had poor swell characteristics.

> The panels made with the lowest wet particle moisture content exhibited the poorest strength and stiffness. This is due to the poor coverage of the soy resin on the paper particles. The numerous uncoated paper particles that are present in the final press panel do not provide significant strength or stiffness to the panel. This resulted in the 55% wet particle moisture content panels having poorer mechanical properties when compared to the other moisture contents. As the viscosity of the resin decreased, the coverage of the paper particles increased. However, there was no detectable difference in strength or stiffness between the wet particle moisture content ranges of 59% to 75%.

Col. 28, lines 9-23.

> The panels manufactured with the 55% wet moisture content particles exhibited poor two-hour and twenty-four hour edge swell characteristics. This was due to the poor soy resin coverage previously mentioned.

Col. 28, lines 48-51.

In contrast, in the claimed invention, "the average moisture content of the cellulosic material is between about 8% and about 35% by weight after application of the resin binder." If particulate material with a moisture content above 55% as in Riebel is used, an additional drying step is needed to reduce the moisture content prior to pressing, or the pressing step must be longer. Col. 6, lines 48-64; and col. 18, line 4 to col. 19, line 9. No additional drying step prior to pressing is needed using cellulosic material having the claimed average moisture content. Paragraphs [0005, 0032, 0043, and 0045-0046]. Thus, the present invention provides a process with fewer steps, and/or lower cost compared to Riebel.

Young is cited as teaching the step of felting. Young does not remedy the deficiencies of Riebel.

Therefore, claims 1-43 would not have been obvious to one having ordinary skill in the art at the time the invention was made over Riebel in combination with Young.

Conclusion

Applicants respectfully submit that, in view of the above remarks, the application is in condition for allowance. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,
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